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PUBLIC RESOURCES ADVISORY GROUP

MEMORANDUM TO: Juan Carlos Arteaga, Deputy Director
Miami-Dade Water and Sewer Department

FROM: Public Resources Advisory Group ("PRAG")

SUBJECT: South Miami Heights Water Treatment Plant ("SMH WTP")
Value for Money Analysis

DATE: November 14, 2014

I. Purpose of Report

The purpose of this report is to develop a Value for Money analysis for a potential public-private partnership for the development, design, construction, operations, maintenance and financing of the Miami-Dade County Water and Sewer Department ("WASD") South Miami Heights Water Treatment Plant ("SMH WTP").

A Value for Money ("VfM") analysis is a management tool that compares, on a net present value basis, the direct costs and the estimated value of the transference of risk between a traditional government procurement project and a public-private partnership ("P3") over the full life of the proposed project. A positive Value for Money result would indicate that a P3 could be expected to provide value to the public sector, either through direct cost savings, time savings, risk avoidance or a combination thereof. A VfM analysis is a management tool, not a predictor of future outcomes.

An example of the value of a risk transfer is equipment maintenance. In a traditional governmental project the government is at risk if the equipment fails due to insufficient maintenance. In a P3, however, the public sector usually would not be responsible for any costs associated with insufficient maintenance. The value to the government of this particular risk transfer to the private sector is the combination of the likelihood of equipment failures and the potential costs of repair minus any incremental costs paid to the private sector.

PRAG has identified certain costs and risks and has developed the financial model to compare the potential financial impact of a traditional government procurement and a public-private partnership. PRAG also developed the expected financing costs for the two alternatives. PRAG is not, however, a designer, builder or operator of water treatment plants and we have relied on WASD and its consulting engineers to provide construction and operating cost assumptions. Where specific construction and operating costs were not provided in writing, PRAG has made assumptions specifically identified herein based on input provided by WASD and their consulting engineers. PRAG makes no assurances as to the reasonableness of the assumptions or that the risks identified herein will occur within the cost and probability ranges provided. This analysis is meant to serve as a management tool to assist in WASD's decision-making process and should be evaluated in light of all the estimates and assumptions contained herein. As a management tool, our financial model will allow the assumptions contained herein to be revised as desired by WASD.

II. WASD Capital Improvement Plan and SMH WTP

WASD provides water and wastewater services to a service area of 2,209 square miles, representing substantially all of Miami-Dade County. For water, WASD serves 14 municipally owned water utilities and approximately 425,000 retail customers. For wastewater, WASD serves 12 municipally owned wastewater utilities, Homestead Air Reserve Base and approximately 340,000 retail customers. WASD treats 300 million gallons of water per day ("mgd") and disposes of 300 million mgd.

WASD is currently in the process of implementing a comprehensive Capital Improvement Plan (the "Capital Plan") for numerous water and wastewater infrastructure projects. Such projects are required to meet the service needs of system customers, accommodate future growth and comply with Federal and State regulations.

WASD's Capital Plan identifies $13.5 billion in total future capital needs over the next 15-20 years. The needs are estimated to be $1.6 billion for compliance with a Consent Decree with the United States Environmental Protection Agency, $4.1 billion for water projects and $9.4 billion for wastewater projects.

SMH WTP

The SMH WTP is a proposed 20 mgd (permitted) water treatment plant to be located on County-owned land to be located at 11800 SW 208th Street in South Miami Heights. The site is currently used for maintenance facilities and office space.

There are two distinct sources of raw water available to WASD, the Biscayne Aquifer ("BA") and the Upper Floridan Aquifer ("UFA"). The BA lies closer to the surface than the UFA and raw water from the BA is easier and less expensive to treat than raw water from the deeper and more brackish UFA. UFA water is higher in chloride, total dissolved solids, specific conductance, and hydrogen sulfide than in the BA. Currently, all of the raw water used by WASD is drawn from the BA.

The SMH WTP was originally designed in 2006 to exclusively use the BA as a raw water sources. Due to regulatory changes, however, WASD will be limited to withdrawing a maximum of 3 mgd from the SMH WTP. The plant was therefore redesigned to use 3 mgd from the BA and the balance from the UFA.

Although other utilities in Florida use water from the UFA, the SMH WTP would be the first plant in WASD's system to use the UFA as a water source. The design and operating complexities of the SMH WTP arise from the use of this new raw water source for WASD and that the plant will be required to have the capacity to treat both types of raw water.

The SMH WTP is expected to use supply wells for BA water located at Caribbean Park and Former Plant, both relatively compact sites. The UFA water, however, is expected to be drawn from wells along the C-1 Canal and Roberta Hunter Park, both of which are long linear sites. Notably, there are no existing UFA wells within 11 miles of the proposed SMH WTP well fields. CDM Smith has completed conceptual designs for both the UFA wellfields and raw water transmission main and the BA wellfields.

CDM Smith has also completed conceptual design plans for membrane treatment for SMH WTP. The current conceptual design plan recommends the following treatment process:

1) Separate sand strainer treatment for each water source to remove sand;
    a. One strainer for BA raw water
    b. Four strainers for UFA raw water
2) Separate acid pre-treatment of each water source to reduce scale formation;
    a. Two 14 inch static mixers for BA raw water
    b. Two 42 inch static mixers for UFA raw water
3) Separate cartridge filter treatment for each water source to remove suspended solids;
    a. One cartridge filter for BA raw water
    b. Seven cartridge filters for UFA raw water
4) Separate membrane treatment for each water source;
    a. One ULP/NF (Ultra-Low Pressure Nano-Filtration) membrane skid to treat raw water from the BA (85% expected design recovery)
    b. Seven RO (Reverse Osmosis) membrane skids to treat raw water from the UFA (75% expected design recovery)
5) Combined degasification and odor control scrubber systems;
6) Combined chlorine contact basin to provide adequate chlorine contact time;
7) Transfer pumps to finished water reservoir; and,
8) Concentrated water disposal system (injection wells) for UFA water.

Pre-treatment chemicals consist of sulfuric acid and an antiscalant. Post-treatment chemicals include hydrated lime, carbon dioxide, sodium hypochlorite, sodium hydroxide, aqueous ammonia, zinc orthophosphate, and flouride.

The conceptual design plan also provided the finished water quality goals with parameters for alkalinity, chloride, color, hydrogen sulfide, Langlier Saturation Index ("LSI"), nitrate, odor, sodium, and calcium hardness.

The major differences between the treatment processes for the BA raw water and the UFA raw water relate to the larger amount of UFA water that will be treated and the higher level of treatment that will be required for the UFA raw water. Additionally, the UFA source water will be drawn from wells relatively far from any existing UFA wells, adding some level of uncertainty to the water source. Because of these factors the SMH WTP will be a more complex facility than WASD's existing water treatment plants.

In November 2013 WASD released a non-binding "Request for Expressions of Interest (EOI) – Public-Private Partnerships (P3s) for Water and Sewer Capital Projects" (the "EOI") to gauge the private sector's interest in potential P3s in connection with WASD's capital improvement plan. The EOI was not a solicitation but is one of the methods WASD has used to gauge the private sector's interest in P3s. WASD received 32 private sector responses from a variety of types of businesses. A majority of the water firms responding expressed specific interest in the SMH WTP project as a potential P3. We view this level of private sector interest a positive factor in the viability of a potential P3 for WASD.

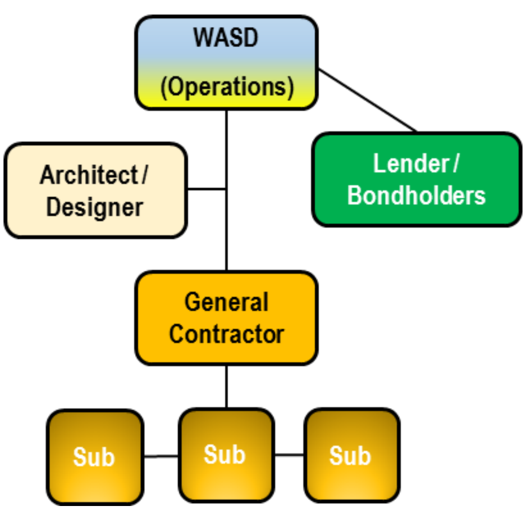
III. Public-Private Partnership Spectrum

A variety of P3 arrangements are available to the public sector and exist on a spectrum based on the degree of risk transfer to the private partner. The most basic P3, which is the traditional method of developing governmental projections, is typically one in which the public sector designs, finances, operates and maintains the project or facility and uses the private sector to build the project to its design specifications (known as "design-build" or "DB"). On the other end of the spectrum is an arrangement whereby the private sector designs, builds, finances, operates and maintains the project to meet the requirements of the public sector ("DBFOM"). There are other models including a full concession model, in which all responsibilities are ceded to the private entity, and full privatization in which the public entity sells an asset to the private sector. In these cases the public sector acts primarily as a regulator. WASD is not considering a full concession or a privatization model.

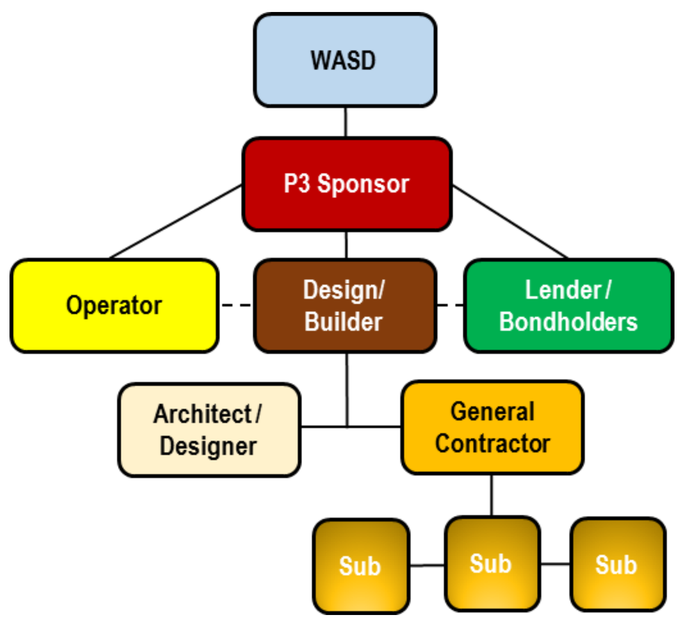
For the SMH WTP the traditional non-P3 option ("design-bid-build" or "DBB") will be considered the base case. The difference between DBB and DB option is that in the DB option a single private sector entity is responsible for designing and building the project. In the traditional DBB option these are two separate functions. Although the public sector may use a private firm to do the design, the design is under the control of the public sector and is separate from the builder.

Another way to visualize the P3 arrangement options is to compare WASD's role in each of the two options under consideration:

<u>Design-Bid-Build</u>



<u>Design-Build-Finance-Operate-Maintain</u>



In the traditional DBB method, WASD enters into separate agreements to design, build, and finance the project, while operations are performed in-house. WASD is ultimately responsible for and bears the risk of the integration of all of these functions. In the DBFOM model, WASD's only agreement is with the P3 sponsor, who then takes the risk and responsibility (both financial and operational) for coordinating and integrating all of the required functions.

US Water P3 Case Study – Carlsbad, California

While the P3 analysis is new to WASD, there are some examples of P3 reverse osmosis systems in the US. In December, 2012 the California Pollution Control Financing Authority issued approximately $733 million in tax-exempt private activity bonds in connection with the construction of a reverse osmosis desalination plant in Carlsbad, California that is privately owned by Poseidon Resources (Channelside) LP and will provide water to the San Diego County Water Authority ("SDCWA"). The plant uses reverse osmosis to desalinate seawater, some of the same techniques are expected to be used by the SMH WTP, although on a lessor scale, to desalinate the brackish water from the UFA.

In the Carlsbad plant, the public sector will pay a fee comprised of multiple components – fixed charges for debt service, equity returns, and fixed and variable components for operating costs.

Under the terms of the P3, the private sector must deliver a specified amount of water that meets SDCWA quality standards. If the private sector fails to deliver the required amounts of acceptable water, it must make payments to SDCWA.

The risks of producing acceptable water at the specified prices are allocated between the private and the public sector. For example, energy is a significant cost component for reverse osmosis water treatment plants. In the Carlsbad project, the private sector retains the risk associated with electricity consumption, while the public sector takes the risk associated with the cost of electricity. Therefore, if the project uses the expected amount of electricity and the cost of electricity increases, SDCWA will be responsible for the cost increase. However, if electricity costs remain steady but the project uses more electricity than anticipated, the private sector will be responsible for the cost increase.

The financing structure for the Carlsbad project was assumed as the financing structure for the P3 option for the South Miami Heights project. The Carlsbad project was financed with a combination of equity (23% of total costs) and private activity tax-exempt debt (77% of total costs). The IRR for the equity was approximately 10%. The cost of the debt was based on the AMT status of the debt and the low investment grade ratings, assumed to be BBB-.

IV. Criteria for Successful P3 / Evaluation of SMH WTP

The first step of the VfM analysis is a qualitative review of the proposed project to determine whether the characteristics of the project align with the criteria for a successful P3. PRAG has identified twelve characteristics, listed below, which are the major criteria for a successful water P3. A project does not have to meet every criterion to be a viable P3, but it should meet a majority of the criteria and the public sector should understand the risks associated with the criteria the proposed P3 project does not meet.

Criteria for a Successful Water P3	
Critical Need/Time Value	**Identifiable Revenue Stream**
Leadership Support	**Measurable Output**
Legal Authority	**Sufficient Project Size**
Greenfield Project	**Project Complexity**
Environmental Approvals in Place	**Significant Operating Costs**
Severability	**Long Lived Asset**

1) **Critical Need / Time Value** – This criterion relates to both the importance of the project and the value attributed to having the project in place on a timely basis. Developing and implementing a P3 requires an initial investment of time and resources by both the public and private sectors. The project should be of such importance that all parties believe that the process will continue through to fruition. Projects that are not highly important do not make good P3 projects for a number of reasons, including: (a) the risk that the public sector might cancel the procurement, thus negatively impacting the private sector; and (b) the higher risk of non-payment by the public partner during the operating phase due to the perceived lower essentiality of the project.

   The private sector can often complete a project faster than traditional government contracting methods; thus, a project that the public sector wants completed rapidly will be more suitable for a P3 due to the higher value assigned to the time to completion. If there is no value associated with earlier delivery, however, this benefit has no value to the public sector.

   The SMH WTP is perceived by WASD to be a project of critical importance with a significant time value component. We believe the public sector will also agree with the importance of the project. First, it is a critical component of WASD's Capital Plan, which must be completed in accordance with the EPA Consent Decree. Second, SHM WTP will diversify WASD's water sources as it will primarily use the UFA as its water source. We believe that the SMH WTP will meet this P3 criterion from both a needs and timing standpoint.

2) **Leadership Support** – The private sector will evaluate the commitment of both senior WASD and County administration and elected officials to the use of P3s. Bidding on and then implementing a P3 requires a significant investment from the private sector. There have been several cases in the United States in which a P3 project was unilaterally cancelled by the public sector during the final stages, resulting in significant losses to the private sector. While this risk is usually greatest with the privatization model, it exists to some extent for any P3 that requires significant upfront private sector investment. We believe that WASD has demonstrated strong leadership support at senior levels for a potential P3 through meetings with industry, membership in industry groups, speaking at conferences and distribution of the EOI. We believe the SMH WTP will meet this P3 criterion.

3) **Legal Authority** – If the public sector does not have legal authority to enter into a P3, none of the other criteria will matter. WASD has reviewed its legal authority with both the County Attorney and outside counsel. As a Home Rule County, Miami-Dade has broad powers and the County Attorney has indicated that its home rule powers would allow a P3 procurement process. In addition, the recently enacted Florida Statute 287.05712 expressly provides statutory approval for P3s. Finally, WASD has engaged bond counsel to review the impact of a P3 for SMH WTP on WASD's existing bond ordinance and bond counsel has indicted that a P3 structure could be allowed under WASD's bond ordinance. We believe that the SMH WTP will meet this criterion.

4) **Greenfield Project** – The most efficient P3 project are generally greenfield, or new development, projects. These types of projects allow the private sector to design all characteristics without having to incorporate existing facilities, equipment and procedures. Additionally, greenfield projects have less impact on existing employees. The SMH WTP would be a greenfield project and therefore meet this criterion.

5) **Environmental Approvals in Place** – Generally, the risk of obtaining environmental and other regulatory approvals is a risk best managed by the public sector. The private sector is less interested in investing in a P3 procurement if there is a risk of delay or cancellation due to regulatory approvals.

   We understand that WASD has obtained the major environmental approvals for the SMH WTP and therefore it meets this criterion.

6) **Severability** – Projects that are severable from the public sector's primary operations pose the least risk to the public sector partner, and therefore are the most efficient P3s. While non-severable, integrated P3's, such as one that would provide 100% of WASD's water needs or treatment are possible, they represent greater risk. Since SMH WTP is only expected to provide a portion of WASD's water needs and water flow could be blocked before any reaches WASD's main distribution system, we believe the project is severable and would meet this criterion.

7) **Identifiable Revenue Stream** – A successful P3 requires an identifiable revenue stream that would be used to pay the private sector. The revenue stream could be individually paid user fees, such as road or bridge tolls paid by drivers, a payment from general government sources, such as the availability payments FDOT will make to the operator of the Port Miami Tunnel, or revenues from the sale of the P3 product. For SMH WTP it is anticipated that WASD would pay a negotiated price for water delivered within the agreed upon parameters. WASD would use funds collected from wholesale and retail water customers, but WASD would not have to pay for the production and treatment of the water itself. The SMH WTP will meet this criterion.

8) **Measurable Output** – A successful P3 must have an output that can be measured. For the Port Miami Tunnel, for example, the output is the availability of the tunnel for public use. For SMH WTP the output is the water produced in accordance with the agreed-upon requirements. The water will be metered and tested as it leaves the plant. The SMH WTP will meet this criterion.

9) **Sufficient Project Size** – Since bidding on and implementing a P3 requires a significant investment by the private sector, the proposed P3 project must be large enough to allow the private sector to obtain a sufficient return on its investment, especially when larger projects may be available. The private sector generally prefers water projects in excess of $200 to $250 million.

   While SMH WTP does not meet this criterion, we believe the potential follow-on projects in WASD's Capital Plan off-set this weakness. The quality of responses to the EOI indicates the private sector's strong interest in the P3 opportunities at WASD. Because of this, we believe that the SMH WTP will generate sufficient private sector interest.

10) **Project Complexity** – An efficient P3 will be complex enough to allow the private sector to add value to the process. A project that has no complexity provides no ability for systems, design, or technology improvements and provides limited, if any, upside for the private sector's participation. One of the complexities associated with the SMH WTP is that it will draw water that is much deeper and require more treatment than the water WASD currently uses. We believe most water treatment plants in general and the SMH WTP in particular meet this criterion.

11) **Significant Operating Costs** – Related to project complexity, an efficient P3 should have a level of operating costs that are high enough to justify the private sector's participation and allow the private sector to generate an acceptable return on its investment. We believe that the operating costs associated with the SMH WTP will meet this criterion.

12) **Long Lived Asset** – As with project complexity and operating costs, the term of the P3 agreement should be long enough to allow the private sector to generate an acceptable return on its investment. If the life of the asset or contract is not long enough, the costs of the private

sector may be too high to allow a positive VfM to the public sector. It is anticipated that the SMH WTP will have useful life and contract term equal to or in excess of 20 years and would therefore meet this criterion.

Summary of Findings

Criteria	Findings
Critical Need/Time Value	✓ Meets
Leadership Support	✓ Meets
Legal Authority	✓ Meets
Greenfield Project	✓ Meets
Environmental Approvals in Place	✓ Meets
Identifiable Revenue Stream	✓ Meets
Measurable Output	✓ Meets
Sufficient Project Size	☒ Does not meet (1)
Project Complexity	✓ Meets
Significant Operating Costs	✓ Meets
Long Lived Asset	✓ Meets

(1) While the Project itself is relatively small, the potential for other P3 opportunities in the Capital Plan should provide for sufficient market interest.

Based on our review of the SMH WTP in connection with the criteria listed above, we believe that the SMH WTP has the characteristics that could allow a successful P3 from both the public sector's and the private sector's perspectives. Based on this analysis, a VfM analysis is warranted to determine whether there is specific financial value to the public sector.

V. Value for Money Process

The premise of a VfM analysis is to compare the full life cycle costs of public ownership and operations versus a P3 arrangement on a NPV basis. Inherent in the concept of VfM is that the lowest upfront cost is not the deciding factor but rather value is maximized by the lowest anticipated life-cycle cost that achieves the desired quality of output.

The VfM analysis will incorporate the difference in the estimated direct costs between the two models as well as evaluate the potential cost of risks that the public sector can shift to the private sector in the P3 arrangement.

PRAG has identified certain costs and risks and has developed the financial model to compare the two alternatives. PRAG also developed the expected financing costs for the two alternatives. PRAG is not, however, a designer, builder or operator of water treatment plants and we have relied on WASD and its consulting engineers to provide construction and operating cost assumptions. Where specific construction and operating costs were not provided, we have made assumptions specifically identified herein based on the costs provided by WASD and its consulting engineers.

Our VfM analysis is based on the following underlying assumptions:

- The private partner will be a large and experienced water utility sponsor with access to proven design, construction, and operating firms and financial partners on a global basis;
- The private sector should be able to build the plant faster and at a lower cost by integrating the design-build function, the use of a more streamlined procurement process, and the implied financial incentives as debt and equity payments do not begin until after the successful commencement of operations;
- The private sector should be able to operate the plant at a lower cost through integrated design, lean staffing levels and employee overhead, and streamlined and global procurement, partially offset by the requirement for private sector operating profit;
- WASD will be able to finance the project at a lower cost of capital using the DBB alternative;
- For the DBB alternative, WASD will finance the project through the issuance of bonds prior to commencing construction and will be responsible for debt service on the bonds without regard to the status of SMH WTP. For the DBFOM alternative, WASD would only be responsible for paying for water that meets its quality standards;
- WASD's entire Capital Plan will benefit from an acceleration of SMH WTP by allowing other projects to be implemented earlier; and,
- The final contract and other implementing agreements and documents reflect the allocations of risk assumed herein.

VI. Cost Components

PRAG has identified the following direct cost components of a water treatment plant VfM analysis:

VfM Cost Components	
Construction Costs	**Financing Costs**
Operating & Maintenance Costs	**Ancillary Costs**

Construction Costs primarily include the costs of design, equipment and construction of the plant and development of the source wells, but additional costs such as permitting and land acquisition may also be included. These costs are usually relatively easy to determine. Inflation tends to have a relatively modest impact on construction costs.

Traditionally WASD has used a DBB process for its treatment plants, although it has used a DB process for certain pipeline projects. In a DBB project WASD is responsible for designing the project, using both in-house and outside engineers, and then bids out the construction. In a P3 project WASD provides output requirements and basic design parameters but the private sector provides both final design and construction services.

Operating and Maintenance Costs include the costs of operations including staff, supplies, utilities, management, reporting, insurance, and both on-going and major maintenance. Some costs, such as staffing, can include significant indirect costs such as human resources, health insurance and pensions. Inflation can have a major impact on operating and maintenance costs. These costs are difficult to quantify over the life of the project.

Financing Costs include the costs to finance the original construction as well as any additional financing needs over the life of the project, whether funded through reserves, cash flow or additional borrowings. These costs are generally relatively easy to determine.

Ancillary Costs represent the additional costs associated with a P3 arrangement including transactions costs and project management costs. These costs can be difficult to quantify but tend to have a significantly lower impact than the other costs.

<u>Cost Estimates</u>

Estimated direct construction costs and operating and maintenance costs for the DBFOM alternative were provided by WASD consulting engineers, CDM Smith[1], and were approved by WASD. Construction and operating costs for the DBB alternative were <u>not</u> provided. Since WASD has never built or operated a water treatment plant similar to the proposed SMH WTP it did not have any estimates of construction or operating costs. In order to estimate construction and operating costs

[1] *01CDMA003_TA12_SMH_OM Cost_15 mgd_082114_Draft; 01CDAM003_TA12_SMH_OPCC_082114_unallocated_Draft*

for the DBB alternative, PRAG adjusted the DBFOM cost assumptions as indicated herein and in accordance with the previously described underlying assumptions.

Private financing costs were developed by PRAG based on the financing structure used for the Carlsbad project, updated with current market conditions. Public financing costs were based on a tax-exempt bond offering assuming WASD's current bond rating and current market conditions. Ancillary costs were estimated based on discussions with WASD staff.

For cash flow modeling purposes, all operating and ancillary costs are assumed to increase at a 3% annual inflation rate. WASD has indicated a preference for a 20-year operating term, therefore we have assumed a 23-year final maturity to allow three years for construction of the project. For present valuation purposes, we assume a discount rate of 4.0%, which corresponds to the assumed yield on WASD's bonds used in the VfM model.

This VfM analysis is meant to serve as a management tool to assist in WASD's decision-making process. Because the cost assumptions contained herein could have a material impact on the VfM results, the VfM results should be evaluated by WASD in light of the identified cost assumptions.

PRAG used the following assumptions to develop the construction and development costs inputs for the VfM analysis:

Construction and Development Costs Assumptions	
Construction	The hard and soft costs associated with building the facility. Estimated costs for the DBFOM construction were provided by CDM Smith. Given the previous assumption that the DBB alterative will have a higher cost, it was assumed that DBB construction costs equal to 105% of the provided DBFOM construction costs.
Design Allowance	The cost for designing the facility. This cost estimate was not provided by WASD or CDM Smith. Based on discussions with both WASD and CDM Smith, slightly lower design costs were assumed for the DBFOM alternative (12% of construction) than for the DBB alternative (15% of construction) due to the integration of design with construction in the DBFOM alternative.
General Procurement	The costs to procure all contracts under both alternatives. This cost estimate was not provide by WASD or CDM Smith. Based on discussions with WASD and CDM Smith, it was assumed that the initial DBFOM procurement will cost $1 million more than the traditional DBB procurement.
Adjustment for Risk Allocation	Since the DBFOM alternative assumes that the private sector will be assuming certain risks pertaining to construction, there should be a premium paid, directly or indirectly, to the private sector for assuming these risks. As described in the risk analysis herein, the private sector is expected to be exposed to approximately $21.1 million in manageable construction risk transfer. A value for the risk allocation is assumed to be approximately 15% of the allocated risk. Therefore, $3.5 million was added to the DBFOM construction cost estimate to account for the value of the risk allocation.

The specific inputs resulting from the assumptions above are provided on the following page:

Construction and Development Costs Inputs			
Cost	**DBFOM Assumption**	**DBB Assumption**	**Comments**
Construction	Estimated DBFOM Construction Costs provided by CDM Smith – **$152,733,545**	105% of Estimated DBFOM Construction Costs provided by CDM Smith – **$160,370,222**	Combined design-build process coordinated with the operator should provide economies of scale
Design Allowance	12% of Estimated DBFOM Construction Costs – **$18,328,025**	15% of DBB Estimated Construction Costs – **$24,055,533**	Combined DB process should provide economies of scale since design and construction will be closely coordinated.
General Procurement	Estimate – **$1,500,000**	Estimate – **$500,000**	Initial P3 procurement costs are expected to exceed traditional procurement costs
Adjustment for Risk Allocation	**$3,500,000**	**$0**	Adjustment to reflect allocation of certain construction risks to the private sector as detailed in the Risk section discussion
Total Construction and Development Costs	**$176,061,571**	**$184,925,756**	

These construction and development cost estimates result in slightly lower costs (4.8% lower) for the DBFOM alternative and are in line with our general assumption that the private sector could build the project at a lower cost.

PRAG used the following assumptions for operating costs.

Operating Costs Assumptions	
Chemicals	DBFOM cost estimate provided by CDM Smith. DBB costs were not provided but were assumed to be between 105% and 110% of DBFOM costs due to the economies of scale and procurement efficiencies in the DBFOM alternative.
Labor	DBFOM cost estimate provided by CDM Smith. DBB costs were not provided but were assumed to be between 125% and 166% of DBFOM costs due to anticipated higher staffing levels and staff overhead and benefits. WASD indicated it would staff the project at a higher level than the DBFOM estimate CDM Smith provided.
Maintenance Supplies	DBFOM cost estimate provided by CDM Smith. DBB costs were not provided but were assumed to be between 105% and 110% of DBFOM costs due to economies of scale and procurement efficiencies in the DBFOM alternative.
Other Direct On-site Costs	DBFOM cost estimate provided by CDM Smith. DBB costs were not provided but were assumed to be the same as the DBFOM cost estimate.
Equipment Renewal and Replacement	DBFOM cost estimate provided by CDM Smith. DBB costs were not provided but were assumed to be between 105% and 120% of DBFOM costs due to the economies of scale, procurement efficiencies and private sector replacement management in the DBFOM alternative.
Membrane and Cartridge Filters Replacement	DBFOM cost estimate provided by CDM Smith. DBB costs were not provided but were assumed to be between 105% and 120% of DBFOM costs due to the economies of scale, procurement efficiencies and private sector replacement management in the DBFOM alternative.
Operator's Overhead and Profit	DBFOM cost estimate (15%) provided by CDM Smith. DBB costs were not provided but were assumed to be lower (10%) to reflect the need for overhead but the lack of a profit requirement.
Power	DBFOM cost estimate provided by CDM Smith. DBB costs were not provided but were assumed to be the same as the DBFOM cost estimate. CDM Smith indicated it could be reasonable to assume a lower power cost for the DBFOM alternative as the private entity might design for lower power requirements, however, we assumed that power costs would be the same.
Contingency	DBFOM cost estimate provided by CDM Smith. DBB costs were not provided but were assumed to be the same 15% level as the DBFOM cost estimate.

The specific inputs resulting from the assumptions above are provided on the following pages:

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Operating Costs Inputs				
Cost (based on 15 mgd Average Daily Production)	**DBFOM Assumption**	**DBB Assumption – Minimum**	**DBB Assumption - Maximum**	**Comments**
Chemicals	CDM Smith DBFOM Estimate – $1,605,000	105% of DBFOM Estimate – $1,685,250	110% of DBFOM Estimate – $1,765,500	Economies of Scale and Procurement
Labor	CDM Smith DBFOM Estimate – $1,418,000	125% of DBFOM Estimate – $1,772,500	166% of DBFOM Estimate – $2,353,880	Staff size and compensation/benefits. WASD indicated DBFOM staffing assumptions are significantly less than they would assume.
Maintenance Supplies	CDM Smith DBFOM Estimate – $50,000	105% of DBFOM Estimate – $52,500	115% of DBFOM Estimate – $57,500	Economies of Scale and Procurement
Other Direct On-site Costs	CDM Smith DBFOM Estimate – $75,000	Same – $75,000		No difference expected
Equipment Renewal and Replacement	CDM Smith DBFOM Estimate – $1,070,820	105% of DBFOM Estimate – $1,124,3671	120% of DBFOM Estimate – $1,284,984	Economies of Scale and Procurement and private sector replacement management
Membrane and Cartridge Filters Replacement	CDM Smith DBFOM Estimate – $448,256	105% of DBFOM Estimate - $470,669	120% of DBFOM Estimate – $537,907	Economies of Scale and Procurement and private sector replacement management
Operator's Overhead and Profit	CDM Smith DBFOM Estimate (15% pre-Power Operating Costs) – $700,061	10% of Pre-power Operating Costs – $518,028 to $607,477		No Public Sector Profit Required

Cost (based on 15 mgd Average Daily Production)	DBFOM Assumption	DBB Assumption – Minimum	DBB Assumption - Maximum	Comments
Power	CDM Smith DBFOM Estimate – $3,342,000	Same – $3,342,000		Assumes cost of electricity will be a pass-through cost
Contingency	CDM Smith DBFOM Estimate (15% of Operating Costs) - $805,071	Same 15% of Operating Costs Contingency Level. Higher total dollars due to assumed higher operating costs - $854,746 to $1,002,337		Same 15% of Operating Costs Contingency Level
Estimated Annual Operating Costs	$9,514,208	$9,895,054 to $11,026,586		Results in Assumed DBFOM Operating Costs 4.0% to 15.9% lower than the Assumed DBB structure
Total Estimated Operating Costs (Nominal)	$287,736,701	$299,254,565 to $333,475,299		
Total Estimated Operating Costs (NPV)	**$173,965,143**	**$180,928,825 to $201,618,625**		

These operating cost estimates result in lower costs (4% to 16% lower) for the DBFOM alternative and are in line with our general underlying assumption that the private sector could operate the project more efficiently. These operating costs results are in line with our general underlying assumption that the private sector could operate the project at a lower cost.

To determine the financing costs PRAG used the Carlsbad project example for the private financing alternative and a traditional WASD tax-exempt bond issue for the public alternative as described below:

Financing Costs Assumptions	
Financing Costs	Financing costs for both alternatives were estimated by PRAG. The model for the DBFOM alternative is the tax-exempt private activity bond and equity financing for the Carlsbad water treatment facility described herein. The model for the DBB alternative assumed WASD financing the entire project with tax-exempt bonds in accordance with WASD existing bond ordinance.

The specific model inputs for the financing costs are described below:

Financing Costs Inputs			
Cost	**DBFOM Assumption**	**DBB Assumption**	**Comments**
Financing Structure	**77% Debt** Tax-Exempt AMT Low Investment Grade Rated Debt 5% Yield **23% Equity** 10% IRR Blended Cost of Capital = 6.17%	**100% Debt** Tax-Exempt Non-AMT "A-" Rated Debt Yield = 4.0%	
Construction / Development Costs	**$176,061,571**	**$184,925,756**	
Assumed Cost of Issuance	$6,975,051	$1,477,539	Higher issuance costs for private debt and equity
Debt Service Reserve	$15,019,726	$17,655,394	1 Year Maximum Annual Debt Service for both
Capitalized Interest	$27,227,732	$27,826,185	3 Years Interest-Only for Both
Total Par Amount	Debt = $181,518,212 Equity = $43,765,868 Total = $225,284,080	Total = $231,884,874	
Annual Financing Costs	Debt Service = $15,019,726 Average Equity = $6,809,527 Total = $21,829,253	Total = $17,655,394	Equity Payments increase 3% annually
Total Financing Costs (Nominal)	$421,565,334	$335,452,485	Assumes Debt Service Reserve Fund is used to make the final payment
Total Financing Costs (NPV)	**$264,726,093**	**$214,390,601**	

These assumptions result in DBFOM financing costs that are 19% higher (incorporating differences in Construction/Development costs) than for the DBB alternative on a NPV basis. These financing cost results are in line with our general assumption that the public sector can finance the project at a lower cost of capital.

Ancillary Costs Assumptions	
Ancillary Costs	Ancillary costs were not provide by WASD or CDM Smith and were estimated based on discussions with WASD.

The specific inputs for ancillary costs are presented below:

Ancillary Costs Inputs			
Cost	**DBFOM Assumption**	**DBB Assumption**	**Comments**
Ancillary Costs	1 FTE During Construction; 1 FTE During Operations	3 FTE During Construction; ½ FTE During Operations	Lower DBFOM costs during construction as less oversight required; Higher DBFOM costs during operations due to monitoring contract-specific compliance
Total Ancillary Costs (Nominal)	$3,342,647	$2,626,412	Assuming $100,000 per FTE
Total Ancillary Costs (NPV)	**$2,134,516**	**$1,985,373**	

Based on the construction and operating costs estimates provided by CDM Smith and the assumptions presented above, the NPV life-cycle costs of the two alternatives over the 23 year term is as follows:

Total Direct Costs		
Cost	**DBFOM Assumption**	**DBB Assumption**
Construction / Development	$176,061,571 (Included in Financing Costs below)	$184,925,756 (Included in Financing Costs below)
Operating	$173,965,143	$180,928,825 to $201,618,625
Financing	$264,726,093	$214,390,601
Ancillary	$2,134,516	$1,985,373
Total Life-Cycle Costs (NPV)	**$440,825,752**	**$397,304,804 to $417,994,604**

Given the cost estimates and assumptions described above, the DBB structure is estimated to save \$23 to \$44 million in NPV life-cycle direct costs. As discussed earlier, however, the direct costs attributed to the DBB structure do not account for the risks to which WASD would be exposed if it were ultimately responsible for the design, construction, financing, operations and maintenance of the project, nor does the DBB structure allow WASD to take advantage of the ability of P3 arrangements to accelerate this project and its overall capital plan. Unanticipated costs or delays in any of these areas could substantially increase the final cost of the project to WASD.

The following section will identify and estimate major risks that could be avoided or transferred to the private sector through the use of the DBFOM structure.

VII. Risk Components

Every construction project and operating utility is exposed to various risks. While not a direct cost of a facility, if the risk event occurs, the cost must be borne by someone. In the traditional procurement method most construction costs and all operating costs are ultimately the responsibility of the public sector. With a P3, however, many risks can be transferred to or shared with the private sector.

In effect, the cost to the public sector for any project is the direct out-of-pocket costs of developing, financing, constructing and operating the facility, <u>plus</u> the potential costs of any risks retained by the public sector. The economic impact of these risks is very difficult to quantify but represent a core component in the VfM analysis.

Based on industry review and discussions with WASD management and CDM Smith, PRAG has identified the following risks that are inherent to the SMH WTP, all or a part of which risk can be avoided or transferred to the private sector using the DBFOM model. Costs that cannot be avoided or transferred to the private sector are not a part of this analysis since they would represent the same risk to WASD under both the DBB and the DBFOM options.

Implicit in the VfM analysis are certain assumptions PRAG has made as to the cost, probability and allocation of various risks. All of the risk assumptions have been discussed with both WASD and CDM Smith, and PRAG has relied on input from WASD and CDM Smith in determining the appropriate risk assumptions.

This VfM analysis is meant to serve as a management tool to assist in WASD's decision-making process. Because the risk assumptions contained herein could have a material impact on the VfM results, the VfM results should be evaluated by WASD in light of the risk assumptions identified herein.

Excluded Costs and Risks

Certain costs and risks that are essentially equivalent whether the SMH WTP is implemented as a traditional government procurement or as a P3 procurement are not included in this VfM analysis. Such excluded costs include, for example, WASD Ancillary Costs (internal and outside consulting and testing services) for on-site monitoring and quality assurance of the construction work, and submittals and related activities of the general contractor and its subcontractors during construction of the Project. Such excluded risks include a group of insurable and uninsurable risks beyond the reasonable control of the contractor, referred to as "uncontrollable circumstances," that would be assumed by WASD regardless of the procurement method. Included among such risks, for example, are changes in applicable regulations or law; force majeure events, such as war, terrorism, abnormal weather conditions, earthquakes and floods; contamination or other variance from agreed-to raw water quality conditions; and site conditions, such as hazardous wastes or materials and unexpected geotechnical conditions. The forgoing costs and risks associated with the SMH WTP would be incurred by WASD under both the traditional government procurement and the P3 procurement options and therefore do not affect the comparison of options in this VfM analysis.

Potentially Transferable Risks

The risks identified below could be and would reasonably be expected to be transferred or avoided by WASD by the use of the DBFOM P3 arrangement.

Development Phase

1) Design – The risk that issues with implementation of the design add costs or delays. This risk is magnified as the design will include untested wellfields and two treatment processes.

2) Impact on Capital Plan – The risk that a traditional procurement process, which will require WASD to manage a greater number of procurements and contracts will require WASD to delay other projects in its Capital Plan because staff is not available to begin other capital projects. This is not a risk that is allocated to the private sector, but because fewer WASD resources will be required during construction it will allow other projects to move forward more rapidly, reducing potential cost inflation and interest rate risk on the entire Capital Plan and accelerating the benefits of the Capital Plan to the community. Although presented along with specific risks, this risk is actually the benefit WASD can receive from the potential acceleration of the SMH WTP as its other projects using a P3 structure.

Construction Phase

1) Scope Changes – The risk that design modifications are required due to unanticipated construction constraints. This risk is magnified in the SMH WTP as untested wellfields will be the primary water source.

2) Owner Delays – The risk associated with delays in construction or cost increases due to public sector delays in bidding the project, addressing bid protests, dealing with change orders or obtaining necessary permits and approvals once financing has been obtained. This risk is minimized with the DBFOM structure because WASD is only executing one contract.

3) Construction Delays – The risk of delayed construction completion due to factors within the contractor's control. Does not include force majeure events that are outside of the control of the contractor and WASD.

4) Construction/Operating Integration – The risk of unexpected costs associated with the raw water delivery system or in connecting and delivering treated water to WASD's distribution system (input and output). This is assumed to be a one-time risk/cost that will require

funding to mitigate. The risk of on-going integration costs are included in Increased Operating Costs below.

Operating Phase

1) Increased Operating Costs – The risk that the operation of the plant requires more staffing, chemicals, equipment or power consumption (not electricity costs) on an on-going basis than originally anticipated and budgeted.

2) Unexpected Equipment Failure – The risk that the equipment fails or requires unexpected additional maintenance after the warranty period but before the end of its expected useful life. This risk also includes latent construction defects.

3) Rate Setting/Deferred Maintenance – The risk that an inability to set rates at a sufficient level to cover all life cycle costs for the plant will result in deferred maintenance and additional costs. This assumes that with WASD operations the overall water rates will have to cover all costs of production and if rates are not sufficient in any year maintenance will be deferred. Under WASD operations and per its rate covenant all operating and maintenance costs must be budgeted and paid for from the overall rates. Under a P3 all operating and maintenance costs are included in the contractual rate.

For this VfM Analysis, the following cost assumptions were made for each of these retained risks:

- Estimated Minimum Cost – the estimate of the lowest cost impact if the risk event were to occur;
- Estimated Maximum Cost – the estimate of the highest expected cost impact if the risk event were to occur;
- Estimated Most Likely Cost – the estimate of the most likely cost impact *if the risk event occurs*; and,
- Probability Range - the estimated range of probability that the risk event actually occurs. Risk events above 90% were assumed to occur and were incorporated in the actual costs, not the risk analysis. Risk events with a probability below 5% were not included in the risk analysis.

The specific cost and probability ranges, as well as the expected timing of the occurrence of each risk factor is shown in the table on the following page.

Risk	Risk Event Cost Impact Assumptions
Design	The cost basis for Design risk is assumed to be the total estimated construction costs. The cost range is assumed to be between 10% and 50% of total estimated construction cost with a most like cost of 20%, which is $32 million in potential risk before probability and allocation factors are assigned.
Impact on Capital Plan	The costs basis for the Impact on the Capital Plan is assumed to be based on the potential acceleration of the immediately upcoming portion of WASD's capital plan totaling $2.4 billion. The use of P3 delivery (both for SMH WTP and future facilities) is assumed to allow acceleration of the capital plan by 3 to 12 months, with 6 months as the most likely case. The savings are calculated based on saving 3% cost inflation on the $2.4 billion for the identified time period. The most likely cost is estimated to be $36 million in potential benefits before probability and allocation factors are assigned.
Scope Changes	Scope change is the risk that design modifications are required due to unanticipated construction constraints. This risk is magnified in the SMH WTP as untested wellfields will be the primary water source. The cost basis is assumed to be construction costs with a cost range of 5% to 15% of construction costs. The most likely cost estimate is 10%, which is $16 million in potential risk before probability and allocation factors are assigned.
Owner Delays	Owner Delays represent the risk associated with delays in construction or cost increases due to public sector delays in bidding the project, addressing bid protests, dealing with change orders or obtaining necessary permits and approvals once financing has been obtained. This risk is minimized with the DBFOM structure because WASD is only executing one contract. The cost basis for this risk is the potential time delay multiplied by the financing cost and the inflation factor. The delay estimates range from 10% to 50% of the construction term with the most like delay assumed to be 25% of the construction term, which is $11 million in potential risk before any probability and allocation factors are assigned.
Construction Delays	Construction delays represent the risk of delayed construction completion due to factors within the contractor's control. While this risk can be mitigated through the terms of the contract, since financing is assumed to be obtained before construction commences, the public sector ultimately bears this risk. The cost basis for this risk is the potential time delay multiplied by the financing cost and the inflation factor. The delay estimates range from 15% to 75% of the construction term with the most like delay assumed to be 40% of the construction term, which is $18 million in potential risk before any probability and allocation factors are assigned.
Construction / Operating Integration	This risk represents unexpected costs associated with the raw water delivery system or in connecting and delivering treated water to WASD's distribution system (input and output) not related to errors in design or construction. The cost basis is assumed to be the total estimated construction costs. The cost range is assumed to be between 5% and 33% of total estimated construction cost with a most likely cost of 20%, which is $32 million in potential risk before probability and allocation factors are assigned.
Increased Operating Costs	Increased Operating Costs represent the risk that the operation of the plant requires more staffing, chemicals, equipment or power consumption (not electricity costs) on an on-going basis than originally anticipated and budgeted. The cost basis for this risk is assumed to be base operating costs. The potential cost increase is assumed to be between 5% and 33% of the base operating cost with a most likely cost of 20%, which is $2.1 million in potential risk annually before probability and allocation factors are assigned. This risk is assumed to occur when operations commence.

Unexpected Equipment Failure	This is the risk that the equipment fails or requires additional maintenance or increased operating costs after the warranty period but before the end of its expected useful life. This risk also includes latent construction defects. The cost basis for this risk is a percent of equipment costs (assumed to be $50 million) with a cost range of 10% to 25% and a most likely cost of 15%, representing $7.5 million in potential risk before probability and allocation factors are assigned. Based on discussions with WASD and its experience with other equipment issues, we assume this risk event lasts for five years (or occurs five times during the life of the project).
Rate Setting/ Deferred Maintenance	This represents the risk that an inability to set rates at a sufficient level to cover all life cycle costs for the plant will result in deferred maintenance and additional costs. This assumes that with WASD operations the overall water rates will have to cover all costs of production and if rates are not sufficient in any year maintenance will be deferred. This risk is primarily a management and political risk. Under WASD operations all operating and maintenance costs must be budgeted and paid for from the overall rates. Under a P3, all operating and maintenance costs are included in the contractual rate. The cost basis for this risk is assumed to be base operating costs. The potential cost increase is assumed to be between 10% and 33% of the base operating cost with a most likely cost of 20%, which is $2.1 million in potential risk annually before probability and allocation factors are assigned. While this risk could occur in any year of operations, for this analysis we assume it begins five years after initial operations and lasts through the life of the project.

Risk	Risk Event Probability and Allocation Assumptions
Design	This risk, while assumed to be a low probability event, is assumed to be higher than might otherwise be expected since the design will integrate two treatment methods, new wellfields and a new water source for WASD. Probability ranges of 5% to 20% were assumed. It is assumed that 95% of this risk can be allocated to the private sector.
Impact on Capital Plan	Since the impact on the capital plan can be estimated more accurately than most of the other risks and is related to the P3 process more than a risk event, the probability of the potential benefit is assumed to be between 50% and 75%. This risk is one that is avoided, not allocated and it is assumed that 95% can be attributed to the use of the P3 structure.
Scope Changes	Scope changes are relatively low probability events and we assumed a probability range between 5% and 15%. We assumed that 80% of this risk would be allocated to the private sector.
Owner Delays	This risk is dependent upon the nature of the project and the number and types of contracts involved. We assumed a probability range between 10% and 25% with 90% of the risk allocated to the private sector.
Construction Delays	Given the nature of the plant and the wellfields, we assumed a moderately high probability range of 25% to 75% with 100% of the risk allocated to the private sector.
Construction/ Operating Integration	We assumed this is a low probability event and assumed a probability range of 10% to 25% with 100% allocated to the private sector.
Increased Operating Costs	While we also assumed this is a low probability event, we gave it a higher upper limit with a probability range of 10% to 33% with 100% allocated to the private sector.
Unexpected Equipment Failure	We assumed this is a low probability event and assumed a probability range of 10% to 25% with 100% allocated to the private sector.
Rate Setting/ Deferred Maintenance	Given the expected budgetary pressure from the size of WASD's capital plan, we assumed a moderate risk with probability ranges of 25% to 50% with 100% allocated to the private sector.

The risk cost, probability, and allocation factors, described above result in the following risk parameters for the SMH WTP. These parameters are interrelated and changes in certain costs assumptions may change the cost of certain risk events.

Risk	Estimated Minimum Cost	Estimated Maximum Cost	Estimated Most Likely Cost	Assumed Occurrence	Probability	
					Lower Range	Upper Range
Design	10% of Construction Cost $16.0 million	50% of Construction Cost $80.2 million	20% of Construction Cost $32.1 million	Middle of Construction	5%	20%
Impact on Capital Plan	3 month acceleration of $2.4 billion capital plan with 3% inflation Saves $18.0 million	12 month acceleration of $2.4 billion capital plan with 3% inflation Saves $72.0 million	6 month acceleration of $2.4 billion capital plan with 3% inflation Saves $36.0 million	Middle of Construction	50%	75%
Scope Changes	5% of Construction Cost $8.0 million	15% of Construction Cost $24.1 million	10% of Construction Cost $16.0 million	Middle of Construction	5%	15%
Owner Delays	10% of Construction Time @ 4% Borrowing Rate and 3% Construction Inflation $4.4 million	50% of Construction Time @ 4% Borrowing Rate and 3% Construction Inflation $22.2 million	25% of Construction Time @ 4% Borrowing Rate and 3% Construction Inflation $11.9 million	Middle of Construction	10%	25%
Construction Delays	15% of Construction Time @ 4% Borrowing Rate and 3% Construction Inflation $6.7 million	75% of Construction Time @ 4% Borrowing Rate and 3% Construction Inflation $33.3 million	40% of Construction Time @ 4% Borrowing Rate and 3% Construction Inflation $17.8 million	End of Construction	25%	75%
Construction/ Operating Integration	5% of Construction Cost $8.0 million	33% of Construction Cost $52.9 million	20% of Construction Cost $32.1 million	End of Construction	10%	25%
Increased Operating Costs	15% of Operating Costs $0.5 million (1)	33% of Operating Costs $3.6 million (1)	20% of Operating Costs $2.2 million (1)	Begins when operations commence	10%	33%
Unexpected Equipment Failure	10% of $50 million in Equipment Costs $5.0 million (1)	25% of $50 million in Equipment Costs $12.5 million (1)	15% of $50 million in Equipment Costs $7.5 million (1)	Begins 10 years after operations commence, continues for 5 years	10%	25%
Rate Setting/ Deferred Maintenance	10% of Operating Costs $1.1 million (1)	33% of Operating Costs $3.6 million (1)	20% of Operating Cost $2.2 million (1)	Begins 5 years after operations commence	25%	50%

(1) Annual Cost

VIII. VfM Results

PRAG developed a financial model that incorporates the procurement, design, construction, O&M, major maintenance, financing and ancillary costs for both the traditional DBB public operation and for the DBFOM P3 private operation. The estimated costs associated with the retained risks identified above are then allocated to each structure based on the expected risk sharing structure for the potential P3.

For example, in the traditional DBB structure 100% of the probability adjusted estimated cost of each retained risk is added to the cost of the public structure since the public sector bears all of these risks. Under the DBFOM P3 structure, each risk was allocated between the public and the private sector. If the private sector is expected to take 100% of a specific risk, no costs are allocated to the public sector. If the risk is assumed to be shared equally, 50% is allocated to the public sector.

The overall costs, including the retained risks, are then calculated for each structure for the life of the project and then the 4% present value factor previously discussed is assigned to bring the full costs back to today's dollars. The table below shows the expected risks, on a NPV basis, and the avoidance or allocation of the risks under the DBFOM structure.

Risk	Nature of Risk	Assumed Percent Avoided or Allocated	Probability Adjusted Most Likely Cost	Amount Avoided	Amount Allocated to the Private Sector	Amount Retained by the Public Sector
Design	Construction	95%	$4.9 million	$0	$4.7 million	$0.2 million
Impact on Capital Plan	Construction	95%	26.3 million	25.1 million	0	1.2 million
Scope Changes	Construction	80%	2.2 million	0	1.9 million	0.3 million
Owner Delays	Construction	90%	2.5 million	2.3 million	0	0.2 million
Construction Delays	Construction	100%	9.1 million	0	9.1 million	0
Construction/ Operating Integration	Construction	100%	5.4 million	0	5.4 million	0
Increased Operating Costs	Operating	100%	8.3 million	0	8.3 million	0
Unexpected Equipment Failure	Operating	100%	7.2 million	0	7.2 million	0
Rate Setting/ Deferred Maintenance	Operating	100%	11.2 million	0	11.2 million	0
Subtotal – Construction			*$50.4 million*	*$27.4 million*	*$21.1 million*	*$1.9million*
Subtotal – Operating			*26.7 million*	*0*	*26.7 million*	*0*
Total Risk Allocation			**$77.0 million**	**$27.4 million**	**$47.8 million**	**$1.9 million**

Risks that are avoided through the use of the DBFOM structure do not require any compensation to the private sector. Any construction and operating risks that are transferred to the private sector, however, must be identified and, if appropriate, the private sector must be compensated in order to take the specific risks.

In discussions with CDM Smith, they indicated that they believe operating overhead, profit and contingency will be available to offset operating risks assumed by the private sector. For the $21.1 million in probability-adjusted construction risk that will be assumed by the private sector, however, they believe some level of compensation would be required by the private sector. We assume a risk premium of approximately 15% of the construction risk is necessary to compensate the private sector for taking these risks. Therefore, $3.5 million was added to the DBFOM construction cost to account for the allocation of construction risk to the private sector.

A Monte Carlo simulation was used to develop the VfM estimate. In a Monte Carlo simulation a very large number of scenarios are run using random numbers within the defined probability ranges. The results show the likely range of results as well as the expected average.

Probability adjustments were made in three main areas. First, certain operating expense components for the WASD-operated project had previously been assessed a probable range as described above. A random number within the stated probability parameters was generated for each of the five variable cost components.

Random numbers were then generated to determine the Probability-Adjusted Estimated Cost for each of the nine risk factors. The cost parameters were within the estimated minimum and maximum cost for each risk and were weighted toward the most likely cost using the following two-step formula:

1) A random number between 0 and 100 was generated. If the random number was above 95 (i.e. 5% of the time) a random cost amount between the estimated minimum and estimated maximum cost was generated and used as the Probability-Adjusted Estimated Cost. This allowed for the full cost range to be utilized in 5% of the scenarios.
2) The other 95% of the scenarios used the following formula:

To weight the costs towards the most likely cost (with W = Weighting Factor):

W = MINIMUM OF (Estimated Maximum Cost – Estimated Most Likely Cost) AND (Estimated Most Likely Cost – Estimated Minimum Cost)

DIVIDED BY (Estimated Maximum Cost – Estimated Minimum Cost)

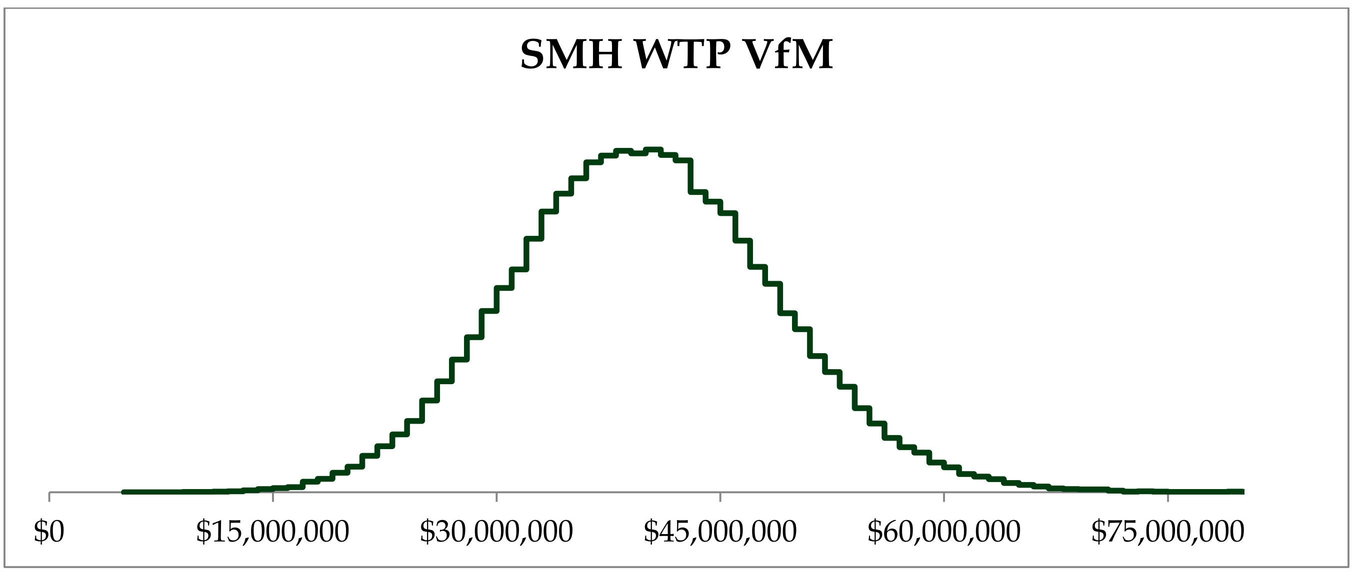
Probability-Adjusted Estimated Cost = ((Random amount between the Estimated Maximum Costs and the Estimated Minimum Cost) + (*W* x Most Likely Cost)) / *W*+1

Another random number was then generated based on the probability range for each risk factor. The randomly adjusted estimated cost was then multiplied by the randomly determined (within the probability range) risk of the event actually occurring. The result was the Probability-Adjusted Risk Cost that incorporates the probability arising from the potential cost and the probability related to the event occurring.

Between the operating costs, the potential risk costs and the risk probabilities, 23 random numbers were generated for each scenario, allowing a variety of results for the calculated VfM. The Monte Carlo simulation was run 100,000 times to model the potential outcomes.

Based on the assumptions detailed herein, the DBFOM structure for the SMH WTP is expected to provide a VfM for WASD of $40 million, or 8% of the risk-adjusted project costs. Because a VfM analysis is based on the estimates of future risk events, it is useful to view the results in a graphical format. The histogram chart below plots the results of each of the 100,000 Monte Carlo simulations. While the average of all of the simulations is $40 million, the individual results range from approximately $84 million in value associated with the P3 arrangement (assuming most of the negative risk events occur) to only $5 million in value (assuming few of the negative risk events occur). The probability that these outliers occur, however, is extremely remote. The majority of the individual simulations resulted in a VfM to WASD of between $31 and $49 million. The expectation is that, given the assumptions and probabilities described herein, on average some of the negative risk events will occur and the resulting VfM associated with the P3 arrangement is approximately $40 million.

Histogram of 100,000 Monte Carlo model simulations



The VfM comparison between the two alternatives, based on the assumptions detailed herein, is as follows:

	DBB	DBFOM	Savings
Direct Costs			
O&M	$191,283,113	$173,965,143	$17,317,970
Financing	214,390,601	264,726,093	(50,335,492)
Ancillary	1,985,373	2,134,516	(149,143)
Total Direct Costs	$407,659,087	$440,825,752	($33,166,665)
Retained Risks			
Design	$4,678,968	$222,808	$4,456,160
Impact on Capital Plan	25,064,394	1,193,543	23,870,852
Scope Changes	1,906,055	317,676	1,588,379
Owner Delays	2,250,133	204,558	2,045,576
Construction Delay	9,068,474	0	9,068,474
Construction / Operating Integration	5,410,501	0	5,410,501
Increased Operating Costs	8,278,844	0	8,278,844
Unexpected Equipment Failure	7,174,962	0	7,174,962
Rate Setting/Deferred Maintenance	11,207,282	0	11,207,282
Total Retained Risks	*$75,039,612*	*$1,938,584*	*$73,101,028*
Total Present Value Life Cycle Costs and Retained	$482,698,699	$442,764,336	
VALUE FOR MONEY		**8.3%**	**$39,934,363**

The VfM for WASD consists of approximately $33 million in higher direct costs less approximately $46 million in construction risk avoidance and approximately $27 million in operating risk avoidance, resulting in a VfM of approximately $40 million.

A Value for Money analysis is inherently an estimate of future risks, potential costs, probabilities and risk allocations. This analysis is based on the information provided by WASD and CDM Smith and the assumptions made by PRAG as described herein. PRAG makes no assurances as to the reasonableness of the assumptions or that the risks identified herein will occur within the cost and probability ranges provided. This analysis is meant to serve as a management tool to assist in WASD's decision-making process and should be evaluated in light of all the estimates and assumptions contained herein.